OPERATOR'S MANUAL

AR-22 TEST AND TRAINING SYSTEM

for the

40mm Mk19 GRENADE MACHINE GUN

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CHAPTER 1 Introduction

General Information. The AR-22 Test and Training System (TTS) for the Mk19 Grenade Machine Gun allows the Mk19 to be fired automatically during exercises, before deployment or operations, or after maintenance. It is powered by standard 7.62mm M82 blanks.

Description. The AR-22 consists of a kit that includes a barrel insert, a mounting yoked with attached round discriminator, 32 belted adapter cartridges that accept M82 blanks, and appropriate hand tools required to service the kit.

Safety Features:

The AR-22's barrel insert is designed to safely capture the bullet from a ball cartridge inadvertently loaded into an adapter cartridge.

WARNING: Use only M82 blanks with the AR-22.

Firing any other cartridge will damage the AR-22, and may damage the Mk19 Machine Gun as well.

Scope: This manual covers installation, use, and maintenance of the AR-22.

Maintenance Forms and Records: None.

Reporting Equipment Improvement Recommendations (EIR): TBD

Destruction of Materiel to Prevent Enemy Use: Not applicable.

Nuclear, Biological and Chemical (NBC): Not applicable.

Patent: The AR-22 is protected by U.S. Patent 5,438-907

CHAPTER 2 Operating Instructions

Perform Function Check:

A. Ensure the safe-fire switch shows "S", confirming that the weapon is on safe.
B. Clear the Mk19. Open the top cover assembly and inspect the feed tray, bolt face, and chamber. Make sure that there is no live ammunition in the weapon.
C. Index the feed slide assembly to the left, ensuring that the secondary drive lever is engaged under the feed slide pin.
D. Close and latch the top cover.
E. Charge the gun and return the charging handles to the forward and up position.
F. Check the function of the safety.
    1. Move the safe-fire switch so that the "S" (safe) is visible.
    2. Depress the trigger. The bolt should not go forward.
    3. Move the safe-fire switch so that the "F" (fire) is visible.
    4. Press the trigger. The bolt should spring forward forcefully.
G. With the bolt forward, open the top cover and
    1. Inspect the interior of the receiver for worn, damaged, dirty, or improperly lubricated parts.
    2. Move the secondary drive lever back and forth to ensure that it moves freely.
    3. Press the feed pawls to check for spring pressure.

NOTE: If deficiencies are found and corrected the Mk19 is operational. If not correctable, the Mk19 is unserviceable.

Installation of the AR-22:

A. Ensure the safe-fire switch shows "S", confirming that the weapon is on safe.

B. Clean and oil the bore.

C. Mount the red AR-22 yoke over the flash suppresser. It cannot be mounted incorrectly. Grasp both ends of the barrel insert and assure that the entire assembly is screwed tightly together. Insert the AR-22 barrel insert into the Mk19's barrel. It cannot be inserted incorrectly. Screw the barrel insert into the yoke 1/8 of a turn after the washer-like springs between the yoke and the 3 nuts *start* to compress. DO NOT OVERTIGHTEN.

D. Pinch the front retainers of the Mk19's feed chute and swing the front outward. Insert the round discriminator (the red piece attached to the yoke with a cable) into the mounting point for the front retainers of the feed chute. The cable may be wound around the barrel to remove slack.

Assembly and Loading of AR-22 Cartridge Belts:

NOTE: It's most efficient to perform each step on all of the cartridges before moving to the next step.

A. Use a 9mm cleaning rod or other suitable tool to push fired blanks (if any) out of the adapter cartridges.

B. Insert each adapter cartridge base-down in the opening of the link positioning tube. Push the adapter cartridge into the link positioning tube to push the cartridge links forward until they stop.

C. Use the pliers to snap the cartridges together to build a belt of desired length. The swivel of each link snaps easily into the opening of the neighboring cartridge's link. Build the belt to the desired length. **For best reliability, it is very important to make sure that the swivel is fully set into the opening, and that the link is fully in position in its groove on the cartridge body.**

D. Insert an M82 blank into the chamber of each adapter cartridge until it snaps into place and can be pushed no farther. The adapter cartridges have a spring that engages the rim of the blank to hold it in the chamber. The base of the M82 blank should be almost flush with the base of the adapter cartridge.

E. The ammunition can is painted blue on the rear to denote that it contains a training device. The opposite (front) of the can is left green to maintain camouflage discipline to the front during training. Insert the loaded belt into the ammunition can with the tips of the cartridges facing front, and with the male end of the belt (the end with the swivel on

it) resting to the right end of the can. The female end of the belt (the end without the swivel on it) MUST be the first cartridge loaded into the Mk19.

(Note: One end of the foam tray at the bottom of the ammunition can is higher than the other end. The high end must be placed to the *right*. The male end of the belt rests next to this high end. The large panels of foam must be at the sides of the ammunition can.)

If the foam pieces within the can becomes lost or unserviceable, new ones may be ordered from ArmaLite or recovered from residue turned in to the Ammunition Supply Point.

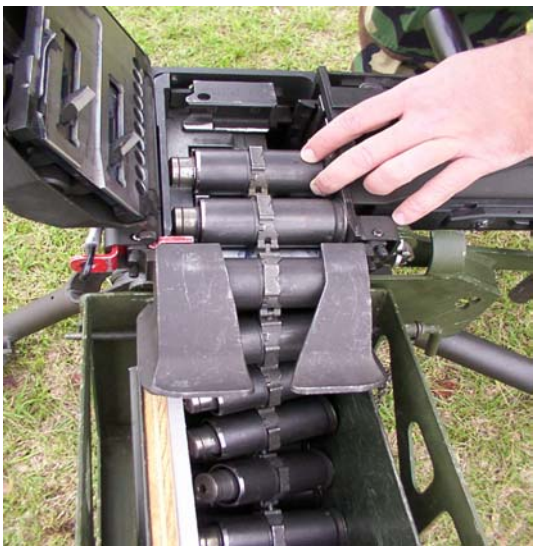
Loading and Firing the Mk19. The AR-22 is fired using exactly the same procedure use with live ammunition. Performance is best when the tripod legs are extended and sandbagged for stability just as they should be when firing HE ammunition.

A. Ensure that the chamber is empty, the bolt is in the forward position, and charger handles are in the up or operational position.

B. Ensure the safe-fire switch shows “S”, confirming that the weapon is on safe.

C. Insert the ammunition can into the ammunition bracket, and fix it in place with the retainer.

D. Open the top cover and insert the first round through the feed throat into the feeder, female link first.



E. Push the round across the first set of holding pawls, ensuring that the round is straight. The links must lie flat or the belt won't close.

F. Index the feed slide assembly to the left and close the top cover. The top cover will close easily if the adapter cartridges are in the correct position with the links lying flat, and the feed slide assembly indexed to the left.

G. Charge the weapon by grasping the charger handles palms down.

1. Press the charger handle locks in.
2. Rotate the charger handles down and pull them **sharply** to the rear. Pull HARD because the springs are strong. THE BOLT MUST BE HELD TO THE REAR BY THE SEAR.

3. Push the chargers forward and rotate the charger handles up to the operational position.

H. Place the safe-fire switch to show “F” and press the trigger.

NOTE: The bolt will spring forward and load the first round onto the bolt face.
NOTE: The weapon must be cycled two times to fully load a round.

I. Ensure the safe-fire switch shows “S”, confirming that the weapon is on safe.

J. Charge the weapon again, as above, by grasping the charger handles palms down.

1. Press the charger handle locks in.
2. Rotate the charger handles down and pull them **sharply** to the rear. Pull HARD because the springs are strong. THE BOLT MUST AGAIN BE HELD TO THE REAR BY THE SEAR.

3. Push the chargers forward and rotate the charger handles up to the operational position.

WARNING: When firing, the charger handles MUST be in the full forward and up position or the weapon will be damaged when the bolt strikes them. Keep the weapon pointed down range. The line of fire must be clear of objects.

K. Leave the safe-fire switch on “S” until ready to fire. To fire, slide the safe-fire switch to “F”, and press the trigger forward. Release the trigger to stop firing.

Fire using short bursts appropriate to this weapon. If excessively long bursts are fired the ammunition belt can "surge" and delink, just as when firing live ammunition.

NOTE: When the Mk19 is mounted on the M3 tripod, ammunition is fed directly from the can. When mounted on a vehicle, attach the ammunition can bracket to the slots on the guns cradle and set the ammunition can on the bracket, securing it with the retaining pin.

Unloading the Mk19 Machine Gun

A. Ensure the safe-fire switch shows "S", confirming that the weapon is on safe.

B. Lock the bolt to the rear by grasping the charger handles palms down.

1. Press the charger handle locks in.
2. Rotate the charger handles down and pull them sharply to the rear. Pull HARD because the springs are strong.
3. Push the chargers forward and rotate the charger handles up to the operational position.

C. Remove the round or spent casing from the bolt face.

1. Inset the tip of a caliber .50 cleaning rod through the right hand rail as close to the bolt face as possible, and above the cartridge.
2. Pivot the rod up to push the case down and force it off of the bolt face and out the bottom of the receiver.

WARNING: DO NOT LET THE TOP COVER SLAM SHUT FROM THE OPEN POSITION. THE OPERATOR MAY BE INJURED OR THE MACHINE GUN COULD BE DAMAGED.

D. Open the top cover.

E. Remove remaining rounds from the feed tray.

1. With one hand beneath the feed tray, press the primary and secondary positioning pawls.
2. At the same time, slide the linked rounds out of the feed tray and feed throat.

CAUTION: REPEATED DRY FIRING OF THE Mk19 WILL CAUSE UNNECESSARY WEAR TO THE BOLT.

F. Place the safe-fire switch to show "F," confirming that the weapon is ready to fire.

G. Ease the bolt forward.

1. Hold one charging handle FIRMLY to the rear.
2. Press the trigger to release the bolt *and ease the bolt forward under firm control.* Don't let it slam forward.
3. Ensure that both charging handles are in the forward and up position.

H. Place the safe-fire switch to show 'S" (safe).

I. Index the feed slide assembly to the left.

J. Close the top cover and make sure that the latche engages.

Analysis of firing.

While firing blanks during training is the most common use of the AR-22, the most important and sensitive uses of the AR-22 are to conduct pre-deployment weapon testing, pre-operational check firing, or post maintenance confirmatory test firing when live ammunition or suitable ranges aren't available.

The AR-22 will power the Mk19 at the same cyclic rate as live ammunition. A burst of approximately 10 rounds is needed to evaluate performance of the Mk19. Evaluate the burst for:

Rate of Fire… speed of operation. While it would be useful to have specialized timing devices to measure rate of fire, such devices are normally not available. It is normally sufficient to have an experienced gunner to evaluate the rate of fire. A slow rate of fire indicates binding, fouling, or other resistance in the system.

Successful firing of all rounds... A Mk19 in proper condition will fire a string of rounds at normal rate of fire, with a uniform tempo, and without failure.

CHAPTER 3 Maintenance Instructions

Removing the AR-22 from the Mk19

A. Ensure the safe-fire switch shows “S”, confirming that the weapon is on safe.

B. Pinch the front retainers of the Mk19's feed chute and swing the front outward. Remove the round discriminator (the red piece attached to the yoke with a cable

D. Unscrew the AR-22 barrel insert from the yoke.

CAUTION: The barrel insert may be hot!

E. Remove the red AR-22 yoke from the flash suppresser. Grasp the insert barrel at each end and assure that the assembly did not come unscrewed during removal.

F. In cool weather, water from propellant gasses may condense on the insert or Mk19 barrel . Wipe them clean and dry, then oil them to prevent damage to either.

Cleaning.

A. Use a rag dampened in CLP or RBC to wipe the outside of each cartridge case.

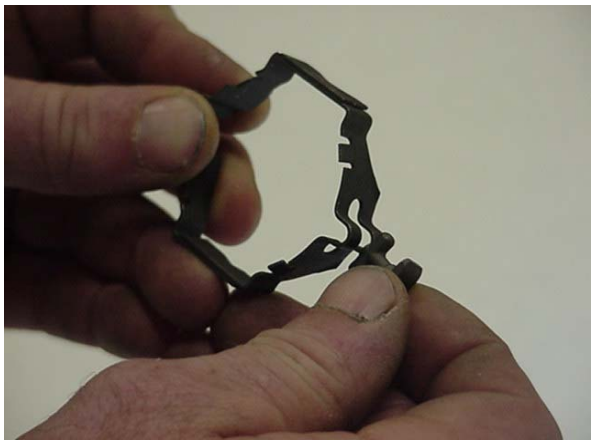
B. Use a 7.62mm cleaning rod, patch holder, and patch to clean the chamber and barrel of each adapter cartridge.

C. Preserve with a light coat of LAW or, if none is available, with CLP.

Replacement of links.

A. Use a small bolt cutter to cut the link at its narrowest point; the circular socket opposite the swivel. Remove and discard.

B. Insert the small, rounded T end of a swivel into the narrow slot of a link. Slip the link over the mouth of the adapter cartridge, with the small, bent tabs of the link forward.



C. Set the link carefully on the cartridge; it must be driven down without tipping or jamming.

D. Use the link positioning tool to press the new link back until it passes the groove at the middle of the adapter cartridge, then use the tool to push it back into the groove.

AR-22 Reliability. The Mk19 firing blanks by means of the AR-22 will suffer a higher level of malfunctions – normally delinkage - than when firing live ammunition because:

Repeated use of the ammunition links wears the links out, and delinkage failures will become more frequent. Correct by replacing the links regularly.

The weapon dynamics are somewhat different than when firing live ammunition. Most importantly, the rearward movement of the bolt is not countered by the forward movement of a projectile, so the weapon jumps differently, adding stress to the ammunition belt. This can be countered by fully extending the legs of the tripod, sandbagging the tripod, and keeping the weapon as low to the ground as possible.

Live ammunition is packaged with dunnage (foam spacers) that carefully guides the ammunition belt as it feeds. The many cylindrical spacers in the ammunition can fall to the ground. While this long-lived rubbish is acceptable on the battlefield, it is strongly frowned upon in training areas. ArmaLite has therefore minimized the dunnage by omitting the cylinders and accepting a small amount of increased belt stress.

Transportation.

A. Clean and dry the cartridges, tools, and the interior of the ammunition can. Place the cartridges and tools in the can.

B. Screw the AR-22 barrel insert into the yoke. The yoke will protect the threads of the barrel.

C. Secure the barrel insert and yoke in a suitable box for transport.

APPENDIX A AR-22 Test and Training System Parts List

Barrel Insert Assembly	- 221400
Yoke Assembly	- 221500
Front Yoke	- 221501
Rear Yoke	- 221502
Round Discriminator	- 221506
Cartridge Assembly	- 229500
Cartridge	- 229520
Link, Cartridge	- 22960010

Note: Swivel, Cartridge Link is supplied with above
Links and swivels may be removed from expended cartridges available at local Ammunition Supply Point

Pliers, 8” Slip Joint	- 22901003
Blank knock out Punch	- 22901002
Bolt Cutters	- 22901004

Link Positioner

APPENDIX B Expendable Supplies and Material List

CLP
Brush, 9mm
Patch, cleaning, .30 caliber
Carbon Removing Compound
Links and link tabs

APPENDIX C Corrosion Prevention and Control (CPC)

Assure that the ammunition can itself is dry and clean inside before storing cartridges, links, and tools inside it. Make sure that the lid seals are intact.

Assure that all adapter cartridges, links, and tools are clean, dry, and lightly oiled with LAW before storing them in the ammunition can.